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STATE OF ALASKA

Jay S. Hammond, Governor

Annual Performance Report for

HARVEST ESTIMATES OF SELECTED FISHERIES THROUGHOUT SOUTHEAST ALASKA

by

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RESEARCH PROJECT SEGMENT

State: Alaska Name: Sport Fish Investigations of Alaska

Project No.: F-9-12

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Job No.: G-I-Q-B Job Title: Harvest Estimates of Selected Fisheries Throughout Southeast Alaska

Period Covered: July 1, 1979 to June 30, 1980

ABSTRACT

Juneau Area - Marine

In order to estimate the sport fishing effort and harvest by Juneau area boating and roadside anglers, and to determine the contribution of facility reared and wild coho salmon stocks marked with coded wire tags to this sport fishery, two creel survey programs were conducted.

From May 1 through September 29, 1979, two creel technicians interviewed returning boat anglers at Auke Bay and Tee Harbor according to a pre-arranged sampling schedule. Interviews were oriented toward obtaining information on effort and catch from the anglers contacted, but additional information was gathered.

Periodic aerial surveys were conducted over the entire marine sport fishing harvest area in order to assess total boat fishing activity during the survey season. Dockside interview data and aerial boat count data were analyzed and coordinated and estimates of total effort and catch were generated.

Juneau area marine boating anglers expended an estimated 246,386 angler hours of effort to catch 3,637 legal size chinook salmon, Oncorhynchus tshawytscha (Walbaum), 6,926 coho salmon, O. kisutch (Walbaum), 4,841 pink salmon, O. gorbuscha (Walbaum), 357 chum salmon, O. keta (Walbaum), 892 Dolly Varden, Salvelinus malma (Walbaum), 5,781 Pacific halibut, Hippoglossus stenolepis Schmidt, and 1,760 other demersal fishes (Pleuronectidae, Scorpaenidae, Hexigrammidae and Gadidae). Table 1 is a list of common and scientific names.

Table 1. List of common and scientific names.

Common Name	Scientific Name and Author
Pink salmon	Oncorhynchus gorbuscha (Walbaum)
Chinook salmon	Oncorhynchus tshawytscha (Walbaum)
Chum salmon	Oncorhynchus keta (Walbaum)
Coho salmon	Oncorhynchus kisutch (Walbaum)
Sockeye salmon	Oncorhynchus nerka (Walbaum)
Dolly Varden	Salvelinus malma (Walbaum)
Rainbow trout	Salmo gairdneri Richardson
Steelhead	Salmo gairdneri Richardson
Cutthroat trout	Salmo clarki Richardson
Brook trout	Salvelinus fontinalis (Mitchell)
Arctic grayling	Thymallus arcticus (Pallas)
Pacific halibut	Hippoglossus stenolepis Schmidt
Flounder	Pleuronectidae spp.
Sablefish	Anaplopoma fimbria
Rockfish	Sebastes spp.
Yellowtail rockfish	Sebastes flavidus (Ayres)

Facility released coho salmon contributed approximately 2 percent of the coho salmon captured in the Juneau marine sport fishery and selected wild stocks of this species from the Taku-Snettisham and Berner's systems contributed approximately 18 percent of the cohos taken in this same sport fishery.

The 33rd Golden North Salmon Derby was held on August 3, 4 and 5, 1979. Participating anglers totaled 4,447 and for the 3 days of Derby fishing there were 8,327 angler validations. Estimates of salmon entered and taken home were as follows: chinook, 350 entered and 657 taken home; coho, 663 entered and 2,561 taken home; pink, 98 entered and 242 taken home; and chum, 52 entered and 44 taken home. In addition to the salmons, an estimated 490 halibut and 240 other demersal fishes were taken home during the Derby.

Juneau - Roadside

From May 1 through September 3, 1979, one creel technician drove the Juneau area roadway interviewing and counting anglers, and placing post card questionnaires on unattended motor vehicles where owners were not in sight. The creel technician worked on a pre-arranged schedule very similar to the marine sampling program.

During the 1979 season, roadside and hike-in anglers expended an estimated 59,164 angler hours to catch an estimated 8,563 Dolly Varden and 10,506 pink salmon. This effort represented a 36 percent increase compared to the estimated effort for 1978. The catch rate for Dolly Varden continued to decline and the mean length of sampled sport caught Dolly Varden in 1979 was significantly less than the mean length of sampled sport caught Dolly Varden in 1977. The estimated total catch of Dolly Varden in 1979 was comparable to recent years catches.

Haines Area Sport Fishery

The Chilkoot River creel survey was conducted from September 22 through October 23. The estimated catch during this time was 258 cohos, 25 chums and 148 Dolly Varden per 4,633 angler hours of effort. The sport fishery took an estimated 32 percent of the cohos entering the Chilkoot system. Of the anglers interviewed, 87 percent were non-Alaskan and 71 percent were Canadian.

OBJECTIVES

1. Determine the saltwater boating angler effort and catch of sport fishes in the Juneau area and determine the contribution of stocks from various artificial and natural rearing areas. The artificial stocks to be evaluated include chinook and coho salmon from the Mendenhall Lakes Salmon Rearing Facility, coho salmon from the Fish Creek Estuarine Rearing Facility and pink salmon

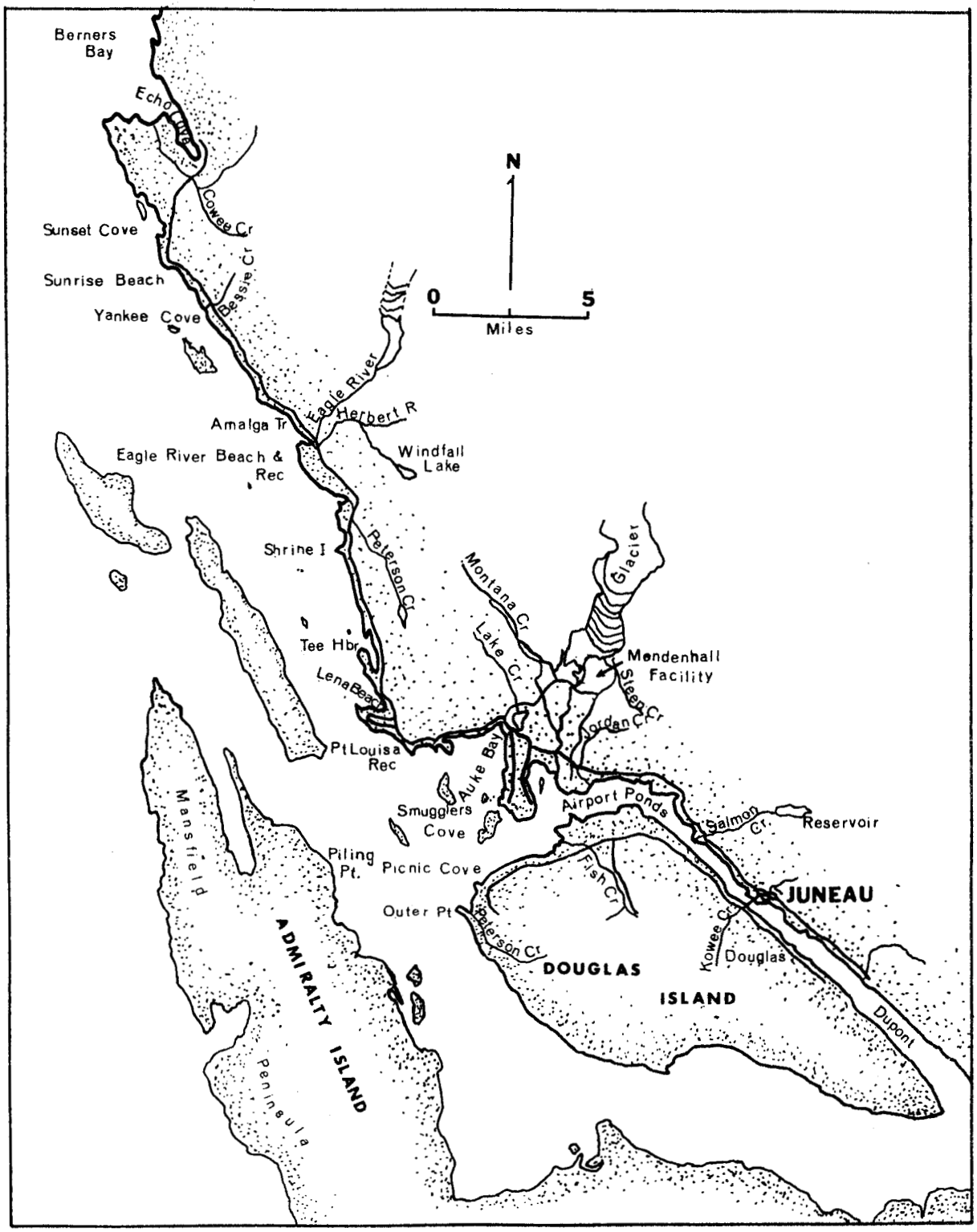


Figure 1. Map of the Juneau area roadside and marine recreational fisheries.

from the Auke Creek Hatchery. The natural stocks to be evaluated include coho salmon bearing coded wire tags from twelve mainland rearing systems in the area from Port Snettisham to Chilkat River.

2. Determine the angler effort and catch in the Juneau area roadside sport fishery and to develop comparable methods for establishing trends from past surveys.

3. Determine the angler effort and catch of coho salmon from the Chilkoot and Chilkat Rivers roadside fisheries in the Haines area.

Recommendations

Management:

1. In the Juneau area the one chinook salmon daily bag and possession limit should continue in effect. Furthermore, the area north of the latitude of Limestone Inlet (south side) to a line from Point Louisa to Piling Point should remain closed for the period April 16 to June 15 to ensure adequate escapement of chinook salmon into the Taku River. With the increased angler effort in the Juneau area this regulation will continue to be necessary until all age classes of the Taku chinook salmon stocks can increase in population size.

2. The fishery for sockeye salmon occurring seasonally in Auke Bay should be closed in 1980 by Emergency Order. The 1974 brood year was from a spawning escapement of only 4,300 adults which experienced poor spawning conditions due to low water and has produced only 5,172 smolts (combined age I and II). As the adult return is composed of approximately 26% two-ocean fish, escapements are expected to be about 20% lower than normal in 1979 and 50% lower than normal in 1980, and will need protection during both of these years (Dewey, 1977).

3. As information is gathered concerning the sport harvest of marine demersal fishes, it might be necessary to instill bag and possession limits on many of these species. There are enough data elsewhere that show many demersal species have been severely impacted by recreational harvesting.

4. The effect of new regulations concerning the taking of Dolly Varden in the Juneau area should be assessed. Alternatives to regulations should be explored. These alternatives could take the form of diverting effort to put-and-take fisheries or initiation of a major roadside Dolly Varden enhancement project.

5. The Haines freshwater salmon fishery needs regulations to reduce the harvest in the Chilkoot River system and prevent the taking of salmon near spawning areas. One possible approach is to reduce the daily bag limit to two or three salmon over 41 cm (16 in.) in length and to close salmon fishing in all areas above 27 km (17 mi.), or above Wells Bridge on the Chilkat River, and above the Chilkoot River weir.

Research:

1. The Juneau marine census should continue in 1980. The sample period should be from May 1 through September 30 to provide catch rates comparable to previous years and to detect changes in effort patterns caused by the new troll regulations.

2. The Juneau marine census should continue to recover marked fish. These will include for 1980: coho from wild coho fingerlings marked in Auke Lake by coho research personnel and chinook from wild chinook fingerlings marked in the Taku River by chinook salmon research personnel.

3. More information is needed concerning the sport harvest of marine demersal fishes. Many of these species are slow growing and long lived, and some species of rockfish exhibit strong home site preference. These attributes could facilitate rapid stock depletion resulting from excessive fishing pressure. It is important to begin assessing the level of harvest of demersal fishes within the Juneau marine sport harvest area.

4. The angler effort and catch of Dolly Varden in the Juneau roadside fishery should be determined during the period of June 1 through August 31, 1980. The Gastineau Channel marine portion of this census should be computed separately to produce data needed by the Board of Fisheries in regulating private nonprofit hatcheries in the area.

5. All creel survey programs in the Juneau area should be designed such that higher levels of confidence can be placed on at least the higher priority estimates; e.g. CPUE, estimated catch or estimated effort.

BACKGROUND

Allocation of resources to multiple user groups often presents problems for resource managers. In the Juneau area, there has been a long history of user conflicts and increasing pressure concerning the harvest of salt and freshwater fishes. Marriott et. al. (1979) has documented these problems in the Juneau sport fishery and also succinctly described the trend in sport fishery regulations toward more restrictive bag and possession limits.

In recent years, creel sampling programs have been implemented for estimating the angling effort and catch by sport anglers and for determining the contribution of salmon from enhancement projects in the Juneau area to the saltwater sport fishery (see Robarts, 1976, 1977, 1978; Marriott, 1979).

The Juneau boat sport fishery should continue to be monitored. It should continue to be monitored because of possible allocation conflicts among different user groups. Allocation problems cannot be resolved, or even clearly elucidated, if the harvest of a resource by a particular user group goes unmeasured.

Haines Area:

The Chilkoot River lake system is semi-glacial with fisherman access confined mainly to the lake shore in front of the Chilkoot campground and to the 2.0 km (1 1/4 M) of Chilkoot River below the lake. This system provides popular Dolly Varden fishing all spring and summer and a concentrated coho fishery in the fall. In 1976, the Division of Commercial Fisheries built a sockeye enumeration weir across the river. This weir has been operated late enough in the year to enumerate the coho run, and creel census observations can be efficiently conducted by the weir crew.

The 1978 weir count and census showed that the sport fishery is capable of taking 50% of the coho run which arrives to the system after escaping the extensive commercial fishery, and therefore this sport fishery needs routine in-season management. Prior to 1979, no special freshwater closures or bag reductions had been imposed on this fishery (except for Chilkoot Lake inlet closures to protect sockeye spawning areas) and the bag limit remained six salmon daily with a possession limit equal to two daily bag limits.

TECHNIQUES USED

Methods - Juneau Recreational Harvest Study

Marine Boat Recreational Harvest Study:

During the period of May 1 through September 29, 1979, anglers fishing from boats were interviewed upon their return to Auke Bay and Tee Harbor. Fishing parties were asked for the number of people fishing, the time they started fishing, method of fishing, time fishing ended, areas fished, target species, the number and species of fish kept, the number, if any, of undersized chinook salmon released. Biological data were taken from fish in the creel. Scale samples, fork lengths, weights, roe samples from females, if possible, were taken from all chinook salmon. Fork lengths and weights were recorded from coho salmon and halibut, although many halibut were too heavy for the spring scales used by the creel technicians.

Chinook and coho salmon were checked for missing adipose fins; heads from such fish were collected. Scale samples were collected from all marked fish.

Dockside coverage went according to a stratified random sampling design. Day time periods were stratified into early day (0600-1400 hrs.) and late day (1400-2200 hrs.) and further grouped as either weekday or weekend-holiday. Hence, four strata were created: early weekday, late weekday, early weekend day, late weekend day.

The survey time period of May 1 through September 29 was broken up into weekly periods. During each week, 2 weekdays were randomly selected and both weekend days were always selected. Whether the day's coverage was to be early or late was also randomized but there was unequal distribution, for late days were sampled more heavily than early days. On holidays, there was always dockside coverage, and it was always in the late day stratum.

With the half day period being the sample time for dock coverage, there were 304 possible sampling periods (2 per each day) during the time of the survey: 106 early week days; 106 late weekdays; 46 early weekend days; and 46 late weekend days. Of these 10, 31, 16 and 30 sampling periods were sampled from the respective strata previously mentioned.

For each week of the survey, interview data were summed by stratum. These stratum sample sums included number of boats, number of anglers contacted, number of anglerhours, number of each species of fish kept and the number of undersized chinook salmon released.

In addition to the sampling schedule elucidated above, a supplemental creel survey was conducted on all weekend late day periods which were not covered during the normal creel survey. This survey was used to intercept more coho salmon with coded wire tags and the information gathered during these supplemental times was not included with normal creel survey data.

Procedure for Estimation of Total Effort and Catch

During the survey season, periodic counts of the number of recreational fishing boats out in the harvest area were made from a low flying fixed-wing aircraft. Owing to budget constraints in 1979, flights were conducted on weekend days only and week day count information from 1978 was used to fill this void for 1979.

These 1.25 to 1.5 hour flights were randomized as to time but they always occurred while creel technicians were on duty at Auke Bay and Tee Harbor. The boats were counted according to the following categories: boats with anglers actively fishing; boats heading toward or away from town; boats anchored; boats beached; canoes and kayaks. On the flight count days, it

was noted from creel survey interviews how many boats had been out with people actively fishing during the time of the aerial boat count.

At the end of the season, count to interview (C/I) ratios were computed for the two weekend strata, in the following way:

$$\Sigma C/\Sigma I$$

where C = the number of boats fishing counted during a flight and I = the number of boats intercepted at Tee Harbor and Auke Bay that were on the fishing grounds with anglers actively fishing during the time of the aerial count.

Owing to the lack of aerial counts during the 2 weekday strata, C/I ratios from 1978 were used. Also, 1978 and 1979 C/I ratios for the 2 weekend strata were pooled, thinking this increase in sample size would result in greater accuracy of ratio estimates.

Estimates of total anglers, effort and catch by species for each week of the survey season were derived in the following way:

1. The number of sampling periods for each stratum during a week was divided by the number of sampling periods actually sampled in each respective stratum; giving stratum ratios for each stratum week.

2. Sample sums for effort and catch were calculated for the four strata for each weekly period.

3. Sample sums from each stratum were multiplied by the appropriate stratum ratio, and these products were multiplied by the seasonal C/I ratio for each stratum, giving estimates for total boats, anglers, effort and catch for the week within each stratum.

4. Stratum estimates within a week were summed for total weekly estimates and weekly estimates were summed for seasonal estimates.

Golden North Salmon Derby

The 33rd Golden North Salmon Derby was held on August 3, 4 and 5, 1979. Fish and Game personnel were stationed at the official Derby weighin stations (judges' floats) at Tee Harbor, Auke Bay and Douglas Harbor, where they weighed, identified and counted all fishes entered in the weight competion. When possible, fork lengths and scale samples were taken from chinook salmon. Fishes entered for door prizes only were identified and counted, and all fish were examined for marks or tags.

Additional personnel were stationed at satellite harbors and boat slips interviewing derby anglers as to how many and what kinds of fish they were

taking home. With this information, take home ratios for each species from each location were calculated by dividing the number of anglers interviewed into their catches, broken down by species.

Total angler validations by day and location were obtained from Derby records, and these numbers were multiplied by sample take home ratios for estimates of the total take home catch by species per site. Estimates of total fish taken home were determined by summing the estimates for each site.

Methods - Roadside

The Juneau area roadside sport fishery survey was conducted from May 1 through September 3, 1979. The sampling schedule and stratification design was identical to that used in the marine boat fishery elucidated in the previous section.

Angler parties were contacted along the Juneau road system while fishing or after completing fishing. Each angler party contacted was interviewed to determine the number of anglers, time spent fishing, the number of fish kept by species, fork length and weight from Dolly Varden, when possible, and whether they had completed fishing or were still fishing.

In addition to the angler interviews, when the creel technician encountered vehicles parked alongside the road adjacent to known fishing areas or trails to lakes, and no anglers were to be found in the immediate area, a postcard questionnaire was left on the vehicles' windshields. The cards had reference numbers relating date and place of issue, and had printed questions asking card recipients whether or not they had been engaged in sport fishing on that day, and if so, what was the specific fishing site, the number of anglers in the party, the time fishing started and ended, and the catch by species.

One technician was employed for the study, covering the entire area from Echo Cove to Dupont and over to Outer Point. The starting point for 1/2 day coverage was selected arbitrarily and was not technically random; the direction of travel alternated with each day of coverage.

A. Interview Survey

1. Catch per angler hour by species was determined for completed and incompleted trips on a monthly basis by summing sample catches and dividing those sums by sample effort of angler hours totaled for each stratum from interviews. Incompleted and completed CPUE data were later pooled.

2. The mean completed trip length, in decimal time was determined from interviews for each stratum on a monthly basis.

3. During the circuit drive on each coverage day, all visible anglers were counted. From these counts, estimates for total anglers by month were computed in the following way. It was assumed that the chance of missing an angler during one 1/2-day's coverage, based on one circuit drive, rested on the relationship of angler trip length and the length of the sampling day (0600-1400 or 1400-2200 hrs., which equated to 8 hours). The assumption, therefore, was that on a given coverage day, an estimate of total anglers would come from multiplying the number of anglers counted by the ratio of hours in the sampling period to mean angler trip length in hours. These ratios, or "angler trip factors", were calculated for each stratum on a monthly basis.

   Finally, estimates of total anglers by month were determined by summing daily stratum estimates of anglers for days actually sampled and then multiplying these sums by the ratio of stratum days in the month to stratum days actually sampled. This gave estimates for total anglers by month for each stratum. Estimates of total anglers by month were obtained by summing the four stratum estimates for each month.

4. Sample mean trip lengths and CPUE by species from interview data for each stratum by month were multiplied by the estimated number of total anglers for each stratum by month, giving estimates for total effort and catch.

B. Postcard Survey

Estimates of fishing effort and catch by off-the-road anglers and anglers missed in the interview portion of the roadside survey were obtained through analysis of the postcard creel survey. Only weekdays and weekends were treated as separate strata, differing from the more extensive stratification used in the saltwater and roadside interview surveys.

Returned postcards were grouped by month of issue and classified as either "have fished" or "not fished". Total postcard issues by month were totaled and then an estimate of total "postcard" anglers by month was determined using the following procedure:

1. Assume the relationship $\frac{X}{\text{Issued}} = \frac{\text{Have Fished Returned}}{\text{All Returned}}$

   where issued = total issues per month,
   all returns = # Cards returned in month,
   have fished = # Cards returned in month indicating fishing was done,
   then x = # Cards issued in month to parties actually fishing.

2. A non-return factor was calculated for each month by taking the number of issues estimated to have gone to fishing parties (X from above) and dividing that by the returns indicating "have fished".

3. Missed car factors were computed for each stratum by month, by dividing the length of the sampling day by mean trip length (fishing trip length plus estimated hike in and out time).

4. A days surveyed factor for each stratum by month was calculated by dividing the total number of days by the number of days actually sampled.

5. Sample angler hours and catch by species were summed for each stratum by month from reading of postcards.

6. Sample totals of effort and catch were multiplied by the three factors: non-return; missed car; and days surveyed, to give estimates for total effort and catch for each stratum by month. Stratum estimates were summed for each month.

Catch and effort estimates from the interview and postcard portions of the census were added for each month to produce the Juneau roadside harvest estimates for the period of May 1 through September 3.

Haines Area Roadside Census:

Field collection of data at Chilkoot River consisted of weir counts of coho salmon, daily morning and afternoon angler counts, and random interviews of anglers.

Upstream migrating salmon were automatically caught in holding pens and captured, examined for species and marks, and released above the weir.

Beginning October 2, one morning and one afternoon angler count was made each day at a random time between dawn and dusk. The time of dawn and dusk was noted, as well as if anglers were fishing above or below the weir.

Angler interviews were conducted at random times as the weir schedule permitted. Usually one morning and one afternoon circuit of the fishery was made. Noted on these interview sheets were: location on the river (above or below the weir); number of anglers per party and residency of anglers; start and stop time for completed trips; and start and interview time for incompleted trips. Catch by species was recorded per angler party and fish were examined for coded wire tags (data needed by the Coho Research project to determine harvest rates in the commercial fishery).

Post seasonal data analysis began with the daily interview sheets. Angler hours per trip, angler hours per day, hours per angler trip (10/2-13 and 10/14-24) and seasonal catch per angler hour were determined. A daily angler hour summary sheet was constructed listing possible morning and afternoon fishing hours by date and angler hours per day based on possible (hours) X observed anglers X hours per trip from the completed trip data.

Early season missing morning observations were calculated from ratios obtained during the October 10-13 pre-closure observation period.

A seasonal catch by species table was constructed from the angler hour table using seasonal CPUE by species. Full-season expansion to a September 22 beginning date was obtained from 1978 angler hour ratios for the missing time period but using the 1979 CPUE data.

Percent of the returns harvested by the sport fishery were obtained by the following formula:

Percent of harvest rate =

$$\text{Total SF catch} \div \frac{[\text{pre-closure} + (\text{pre-closure \%})]}{[\text{weir count} \quad (\text{effort below} \times \text{SF catch})]} + \frac{[\text{Post-closure} + (\text{Post-closure \\%} \times \text{Post-closure})]}{[\text{weir count} \quad (\text{effort below} \quad \text{SF catch})]}$$

FINDINGS

Juneau Area Marine Recreational Harvest Study

During the survey season, an estimated 44,414 angler trips, totaling 246,386 angler hours were expended in this fishery, resulting in estimated catches of 3,637 chinook salmon, 6,926 cohos, 4,841 pinks, 357 chums and 29 sockeyes. Additional to the salmons, 892 Dolly Varden char, 5,781 Pacific halibut and 1,760 rockfishes and other demersal fishes were caught during the harvest study season. These estimates do not include catches during the salmon derby (Table 2).

The following equations were used to estimate total CWT cohos caught in the sport fishery and total contribution of stocks to the Juneau Marine Sport Fishery:

Starting with the relation:

$$\frac{\text{number marked coho in sample}}{\text{number of all coho observed in sample}} = \frac{\text{Est. of all marked coho}}{\text{Est. of all coho caught}}$$

then Est. of all marked coho caught =

$$\frac{(\text{Marked coho in sample})(\text{Est. of all coho caught})}{\text{Number of all coho in sample}}$$

This equation is essentially the Peterson Index (see Ricker, 1975) and is based on the assumption that the sample accurately represents what is found in the entire population. That is, the relationship of number of marked fish to all fish in the sample is the same as marked fish to all fish in the population.

Table 2. Estimate of Angler Catch and Effort by Species and Period Juneau Marine Sport Fishery - 1979

	1 5/1-5/6	2 5/7-5/13	3 5/14-5/20	4 5/21-5/27	5 5/28-6/3	6 6/4-6/10	7 6/11-6/17	8 6/18-6/24
Boat Trips	454	516	1,045	841	1,118	1,049	923	998
Angler Trips	1,096	1,209	2,375	2,134	2,775	2,830	2,510	2,676
Angler-Hours	4,165	4,551	10,979	10,717	13,400	15,654	13,364	15,706
Chinook (≥ 71 cm)	94	187	355	445	330	215	227	234
Chinook (≥ 71 cm)		(65)	(193)	(169)	(143)	(394)	(215)	(255)
Coho							10	36
Pink			6				6	15
Chum								6
Sockeye								10
Trout-Char		9	82	20	21	121	125	43
Halibut	7		94	37	79	122	261	270
Other (Rockfish)			10		51			10

Table 2. (Cont'd.) Estimate of Angler Catch and Effort by Species and Period Juneau Marine Sport Fishery - 1979

	9 6/25-7/1	10 7/2-7/8	11 7/9-7/15	12 7/16-7/22	13 7/23-7/29	14* 7/30-8/5	15 8/6-8/12	16 8/13-8/19
Boat Trips	851	1,100	1,339	881	1,338		992	978
Angler Trips	2,157	3,128	3,544	2,461	3,498		2,610	2,659
Angler-Hours	16,409	18,256	18,023	13,681	22,929		16,099	17,232
Chinook (≥ 71 cm)	126	176	349	320	230		59	78
Chinook (≥ 71 cm)	(239)	(199)	(128)	(311)	(176)		(87)	(106)
Coho	61	418	666	497	893		717	721
Pink	78	1,549	986	900	372		156	175
Chum	6	28		6	6		11	74
Sockeye	19							
Trout-Char	27	129	144	143	18			
Halibut	385	477	224	280	791		876	661
Other (Rockfish)		98	228	11	353		97	340

Table 2. (Cont'd.) Estimate of Angler Catch and Effort by Species and Period Juneau Marine Sport Fishery - 1979

	17 8/20-8/26	18 8/27-9/2	19 9/3-9/9	20 9/10-9/16	21 9/17-9/25	22 9/24-9/29	Seasonal Total
Boat Trips	988	609	715	144	170	29	17,008
Angler Trips	2,618	1,530	1,727	423	377	77	44,414
Angler-Hours	14,594	7,398	9,194	1,868	2,001	166	246,386
Chinook (≥ 71 cm)	25	141	37	6	3		3,637
Chinook (≥ 71 cm)	(51)	(52)	(27)				(2,810)
Coho	1,095	881	778	82	61	10	6,926
Pink	514	62	22				4,841
Chum	82	70	62	6			357
Sockeye							
Trout-Char			10				892
Halibut	457	221	307	67	117	48	5,781
Other (Rockfish)	460	84	18				1,760

*Derby week, normal sampling suspended; no Derby data included above.
-most effort during this week was in Derby; see Derby results elsewhere.

Table 3. Comparison of Golden North Salmon Derby angler effort and catch estimates, 1959-1979.

Year	Dates Held	Angler Validations	Chinook Salmon		Coho Salmon		Pink Salmon		Chum Salmon		Sockeye Salmon	
			Entered	Taken Home	Entered	Taken Home	Entered	Taken Home	Entered	Taken Home	Entered	Taken Home
1959	July 24-29	3,511	599	*	862		0					
1960	July 29-31	3,479	361		650		19					
1961	. . . .	2,818	221		551		22					
1962	July 27-29	2,033	226		490		7		10			
1963	July 26-28	2,229	617		695		115		12			
1964	July 31-Aug. 2	4,940	624		1,246		297		5			
1965	July 23-25	1,598	454		821		16		4			
1966	July 22-24	N/A	795		290		92		33			
1967	July 28-30	3,228	431		633		144		27			
1968	Aug. 2-4	3,350	424		1,908		382		6			
1969	. . . .	3,825	477		1,225		603		26			
1970	. . . .	3,800	375		919		124		9			
1971	July 16-18	7,434	682		1,331		409		226			
1972	July 21-23	8,199	528		1,817		328		123			
1973	July 20-22	7,915	637		449		278		34			
1974	July 26-28	7,714	291		1,526		226		24			
1975	July 18-20	7,847	276	184	315	354	174	531	15	14	0	0
1976	July 23-25	8,466	136	167	536	1,135	58	96	4	12	1	0
1977	Aug. 5-7	8,762	161	355	1,206	2,419	259	55	28	1	1	0
1978	Aug. 11-13	8,283	210	40	1,799	1,076	122	98	13	9	0	0
1979	Aug. 3-5	8,327	350	657	663	2,561	98	242	52	44	0	5
1979	(490 halibut and 240 other demersal fishes taken home)											

* No Data Collected

Estimating the contribution of a facility release of fish, where the total release is known and some known portion of these fish are marked, can be obtained by simply multiplying the estimated number of marked fish caught in the fishery by the ratio of total fish released to number of marked fish released. In other words, the estimate would be:

Contribution to fishery =

$$\frac{\text{estimated catch in fishery (marked fish)}}{\text{observed catch in the creel(in creel)}} \frac{\text{(total release)}}{\text{marked release}}$$

Where wild stocks are concerned and population sizes (total releases) are not known, past studies indicate where population size has been estimated, the ratio of marked rearing coho to the rearing population is equal to the ratio of marked mature coho to all mature coho counted during an escapement survey of these same fish (Gray et al., 1978).

In Tables 4 and 5 are the estimates of total tagged fish captured and the total contribution of facility released and wild stocks of coho salmon to the Juneau Marine Sport Fishery.

Table 6 shows catch rates by species for each week of the survey period. Table 7 shows the effort and catch for 1979 compared to past years' estimates and Table 8 compares biweekly catch rates of chinook for years 1960 through 1979, and Table 9 compares biweekly catch rates of coho for years 1960 through 1979.

Juneau Area Roadside Recreational Harvest Study

During the 1979 harvest season, Juneau roadside anglers expended 59,164 angler hours of effort to catch an estimated 8,563 Dolly Varden, 10,506 pink salmon and other fishes (see Table 10). Table 11 shows rates of catch by species and month per angling trip and per angler hour. Table 12 compares catch rates of this year to past years' estimates.

Haines Area Roadside Census

Results of the Chilkoot River coho fishery census in 1979 indicated that during the September 22 - October 23 time period, 820 angler trips were made, totaling 4,633 angler hours. Total catches were 258 coho salmon, 25 chum salmon, and 148 Dolly Varden. This represents respective catch rates of 0.055, 0.006, and 0.032 fish per angler hour. The pre-sport fishery escapement was calculated at 1,070 coho. With a 24% sport fishery harvest rate, the calculated spawning ground escapement was 812 coho salmon.

A comparison of 1979 census data with that collected in 1974 and 1978 (Table 13) suggest that slightly fewer anglers than in 1978 were fishing longer to catch only 27% as many coho per hour. This poor catch success reflected a poor return of coho, as demonstrated by the low weir count. On

Table 4. Tag Codes and Numbers of Cohos Released From Local Facilities, Expected for Return in 1979.

Facility	Date Release	Fin Clip/ Binary Code	Marked Fish In Release Group	Total Release	Tags + Recovered	EST. * Total Caught
Mendenhall	5/03/78	AD/4-18-14	10,124	68,034	2	
Mendenhall	5/03/78	AD/4-18-54	10,565	10,565		
Fish Creek	5/18/78	AD/4-18-24	17,765	18,239	2	8
Fish Creek	5/18/78	AD/4-16-3	16,046	16,749	5	14
Fish Creek	5/18/78	AD/4-18-55	9,281	9,470	2	4
Fish Creek	5/18/78	AD/4-18-56	9,338	9,529		
Fish Creek	5/18/78	AD/4-18-57	10,074	10,135		
Fish Creek	5/18/78	AD/4-18-11	9,827	10,048	1	
Fish Creek	5/18/78	AD/4-18-12	9,531	9,745	4	28
Fish Creek	5/18/78	AD/4-18-13	9,644	9,901	2	6
Fish Creek	5/18/78	NONE	NONE	40,034		
Fish Creek	5/18/78	NONE	NONE	33,945		
Fish Creek	7/19/78	AD/4-18-15	10,009	10,172		
Fish Creek	7/19/78	AD/4-18-21	4,927	4,972		
Fish Creek	7/19/78	AD/4-18-6	5,275	5,506	2	12
Fish Creek	7/19/78	AD/4-18-32	8,694	9,902		
Fish Creek	7/19/78	AD/4-18-33	9,585	9,881		
Fish Creek	7/19/78	AD/4-18-21	9,567	9,832		
TOTAL RELEASED			160,152	296,659	20	72

\+ Tags recovered included all tags recovered from creel sampling, voluntary returns and Derby interceptions

* Estimates of total marked fish caught based on recoveries from creel sampling only.

Estimated total contribution of marked and unmarked released fish to sport fishery: 140 coho

Table 5. Tag Codes of Wild Cohos Expected to Return Through The Juneau Sport Harvest Area In 1979.

Area	Code	# Tagged	Tags Recovered	Est.Total Tags	Est.Stock Cont.
Main Stikine River	4-17-18	1,669			
	4-17-19	2,116			
	4-16-31	2,461			
	4-16-35	2,086			
	4-06-16	162			
Total Stikine		8,494			
Main Taku River	4-16-29	1,958			
Moose Lake	4-16-19	5,035	1	4	730
Moose Lake	4-16-21	2,622	1	6	
Moose Lake	4-16-22	88			
Sockeye Creek	4-16-45	4,450	3	8	
Yehring Creek	4-16-18	5,058			
Total Taku		19,211			
Chilkoot Lake	4-16-23	2,545			
	4-16-24	539			
Total Chilkoot		3,084			
Chilkat Ponds	4-16-28	1,987			
	4-16-27	742			
Airport Ponds	4-16-20	4,060			
Mosquito Lake	4-16-46	5,741	1	...	
	4-16-26	264			
Chilkat Lake	4-16-25	2,284			
Total Chilkat		15,078			
Berners River	4-17-29	10,758	1	8	144
	4-16-37	380			
Total Berners		11,138			
Speel Lake	4-16-48	5,358	4	5	69
Crescent Lake	4-16-47	5,825	1	5	284
	4-16-36	340			
Total Crescent		6,165			

Table 5. (Cont'd.) Tag Codes of Wild Cohos Expected to Return Through The Juneau Sport Harvest Area in 1979.

Area	Code	# Tagged	Tags Recovered	Est.Total Tags	Est.Stock Cont.
Porcupine Creek	3-16-25	1,321			
	3-16-26	1,971			
	3-16-27	1,778			
Total Porcupine		5,070			
Grand Total =		73,589	11	36	1,227

Table 6. Estimate of Catch Per Unit of Effort in the Juneau Area Marine Sport Fishery May 1 - September 29, 1979.

	1 5/1 5/6	2 5/7 5/13	3 5/14 5/20	4 5/21 5/27	5 5/28 6/3	6 6/4 6/10	7 6/11 6/17	8 6/18 6/24	9 6/25 7/1	10 7/2 7/8	11 7/9 7/15	12 7/16 7/22
Contacted Anglers	162	166	388	306	461	284	536	508	321	558	551	333
Hours/Trip	3.80	3.26	4.62	5.02	4.83	5.53	5.32	5.87	7.61	5.84	5.09	5.56
Chinook/												
Angler Hour	.023	.041	.032	.042	.025	.014	.017	.015	.008	.010	.019	.023
Angler Trip	.086	.155	.149	.209	.119	.076	.090	.087	.058	.056	.098	.130
Coho/												
Angler Hour	.000	.000	.000	.000	.000	.000	.001	.002	.004	.023	.037	.036
Angler Trip	.000	.000	.000	.000	.000	.000	.004	.013	.028	.134	.188	.202
Pink/												
Angler Hour	.000	.000	.000	.000	.000	.000	.000	.001	.005	.085	.055	.066
Angler Trip	.000	.000	.003	.000	.000	.000	.002	.006	.036	.459	.278	.366
Chum/												
Angler Hour	.000	.000	.000	.000	.000	.000	.000	.000	.000	.002	.000	.000
Angler Trip	.000	.000	.000	.000	.000	.000	.000	.002	.003	.009	.000	.002
Sockeye/												
Angler Hour	.000	.000	.000	.000	.000	.000	.000	.001	.001	.000	.000	.000
Angler Trip	.000	.000	.000	.000	.000	.000	.000	.004	.009	.000	.000	.000
Trout-Char/												
Angler Hour	.000	.002	.007	.002	.002	.008	.009	.003	.002	.007	.008	.010
Angler Trip	.000	.007	.035	.009	.008	.043	.050	.016	.013	.041	.041	.058
Halibut/												
Angler Hour	.002	.000	.009	.003	.006	.008	.020	.017	.023	.026	.012	.020
Angler Trip	.006	.000	.040	.017	.028	.043	.104	.101	.178	.152	.063	.114
Other (Rockfish, Cod)/												
Angler Hour	.000	.000	.001	.000	.004	.000	.000	.001	.000	.005	.000	.001
Angler Trip	.000	.000	.004	.000	.018	.000	.000	.004	.000	.031	.000	.004

Table 6. (Cont'd.) Estimate of Catch Per Unit of Effort in the Juneau Area Marine Sport Fishery May 1 - September 29, 1979.

	13 7/23 7/29	14 7/30 8/5	15 8/6 8/12	16 8/13 8/19	17 8/20 8/26	18 8/27 9/2	19 9/3 9/9	20 9/10 9/16	21 9/17 9/23	22 9/24 9/29	SEASONAL CPUE
Contacted Anglers	375	...	323	384	490	171	430	61	59	8	6,875
Hours/Trip	6.55	...	6.17	6.48	5.57	4.84	5.32	4.42	5.31	2.16	$\bar{x}$ = 5.55
Chinook/											
Angler Hour	.010	...	.004	.005	.002	.019	.004	.003	.001	.000	.015
Angler Trip	.066	...	.023	.029	.010	.092	.021	.014	.008	.000	.082
Coho/											
Angler Hour	.039	...	.045	.042	.075	.119	.085	.044	.030	.060	.028
Angler Trip	.255	...	.275	.271	.418	.576	.450	.194	.162	.130	.156
Pink/											
Angler Hour	.016	...	.010	.010	.035	.008	.002	.000	.000	.000	.020
Angler Trip	.106	...	.060	.066	.196	.041	.013	.000	.000	.000	.109
Chum/											
Angler Hour	.000	...	.001	.004	.006	.009	.007	.003	.000	.000	.001
Angler Trip	.002	...	.004	.028	.031	.046	.210	.014	.000	.000	.008
Sockeye/											
Angler Hour	.000	...	.000	.000	.000	.000	.000	.000	.000	.000	.000
Angler Trip	.000	...	.000	.000	.000	.000	.000	.000	.000	.000	.001
Trout-Char/											
Angler Hour	.001	...	.000	.000	.000	.000	.001	.000	.000	.000	.004
Angler Trip	.055	...	.000	.000	.000	.000	.006	.000	.000	.000	.020
Halibut/											
Angler Hour	.034	...	.054	.038	.031	.030	.033	.036	.058	.289	.023
Angler Trip	.226	...	.336	.249	.175	.144	.178	.158	.310	.623	.138
Other (Rockfish, Cod)/											
Angler Hour	.015	...	.006	.020	.032	.011	.002	.000	.000	.000	.007
Angler Trip	.101	...	.037	.128	.176	.055	.010	.000	.000	.000	.040

Table 7. Comparative seasonal angler effort and catch for Juneau area marine recreational fishery, May 1 through September 3, 1960-1979.

Year	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Angler Trips	4,934	6,550	6,220	9,787	10,864	9,863	11,598	11,059	21,095	15,812
Angler Hours	24,496	27,376	32,001	49,059	51,266	46,614	58,694	53,370	89,203	60,192
Mean Hrs/Trip	4.96	4.18	5.14	5.01	4.72	4.73	5.06	4.83	4.23	3.81
Chinook	1,065	828	520	2,234	2,780	1,634	2,726	1,599	3,075	2,141
(Chinook > 66 cm)	(905)	(708)	(499)	(1,704)	(1,954)	(1,259)	(1,797)	(1,097)	(2,360)	(1,331)
Coho	425	664	743	2,940	1,813	2,526	1,462	1,063	8,363	2,403
Pink	47	55	35	211	164	45	190	139	1,595	1,175
Chum	8	19	29	39	0	14	27	35	36	24
Sockeye	0	0	0	0	0	5	41	5	63	0
TOTAL SALMON	1,545	1,566	1,327	5,424	4,757	4,224	4,446	2,841	13,132	5,743
Trout & Char	139	3	64	270	295	115	280	379	897	362
Pacific Halibut	433	13	1,254	1,332	1,029	1,523	3,105	1,930	3,354	3,312
Other Species	86	0	152	159	164	60	113	24	282	184

Table 7. (Cont'd.) Comparative seasonal angler effort and catch for Juneau area marine recreational fishery, May 1 through September 3, 1960-1979.

Year	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Angler Trips	34,328	22,790	15,150	21,773	20,766	18,004	30,591	44,240	45,803	41,810
Angler Hours	127,349	98,792	58,473	93,304	112,865	91,527	156,793	219,174	205,560	233,157
Mean Hrs/Trip	3.71	4.33	3.86	4.29	5.44	5.08	5.13	4.95	4,49	5.57
Chinook	2,886	3,735	1,742	2,604	2,326	1,277	2,184	3,302	2,758	3,591
(Chinook > 66 cm)	(2,299)	(2,328)	(912)	(1,465)	(1,808)	(987)	(2,184)	(3,302)	2,758	3,591
Coho	5,635	3,052	6,274	2,576	5,622	4,541	6,873	8,635	13,039	5,995
Pink	1,613	435	575	909	1,110	824	446	1,997	5,978	4,819
Chum	72	380	224	75	89	108	167	123	234	289
Sockeye	10	8	0	0	32	21	146	1,243	2,265	29
TOTAL SALMON	10,216	7,610	8,815	6,164	9,179	6,771	9,816	15,300	24,274	14,723
Trout & Char	1,479	922	2,147	1,319	742	803	205	1,334	881	882
Pacific Halibut	4,043	1,450	1,833	3,098	1,366	756	915	1,026	704	5,242
Other Species	331	143	30	540	738	259	355	400	162	1,742

Table 8. Comparative chinook salmon caught per angler hour of effort during the Juneau area marine recreational fishery.

Period	1 5/1- 5/14	2 5/15- 5/28	3 5/29- 6/11	4 6/12- 6/25	5 6/26- 7/9	6 7/10- 7/23	7 7/24- 8/6	8 8/7- 8/20	9 8/21- 9/3	10 9/4- 9/17	11 9/18- 10/1	12 10/2- 10/15	Seasonal Mean
1960	.092	.047	.072	.063	.065	.033	.020	.031	.008	.000			.049
1961	.051	.064	.060	.034	.036	.029	.035	.020	.005				.036
1962	.022	.033	.030	.014	.003	.014	.034	.008	.015				.016
1963	.090	.089	.086	.048	.060	.045	.030	.019	.020	.013			.046
1964	.075	.070	.065	.053	.045	.078	.039	.022	.013				.054
1965	.055	.069	.059	.028	.027	.037	.032	.014	.013				.035
1966	.000	.036	.026	.033	.027	.020	.022	.028	.034				.029
1967	.008	.031	.045	.035	.032	.025	.019	.012	.018				.030
1968			.028	.033	.036	.048	.035	.028	.023				.037
1969			.036	.047	.048	.034	.033	.030					.038
1970			.046	.025	.016	.028	.015	.017	.013				.021
1971	.014	.041	.052	.038	.032	.034	.033	.040	.027	.015			.015
1972			.016	.031	.023	.033	.029	.049	.024	.028			.029
1973	.050	.029	.032	.035	.048	.057	.029	.012	.023				.030
1974	.007	.017	.015	.036	.031	.017	.018	.014	.017	.017			.020

Table 8. (Cont'd.) Comparative chinook salmon caught per angler hour of effort during the Juneau area marine recreational fishery.

Period	1 5/1- 5/14	2 5/15- 5/28	3 5/29- 6/11	4 6/12- 6/25	5 6/26- 7/9	6 7/10- 7/23	7 7/24- 8/6	8 8/7- 8/20	9 8/21- 9/3	10 9/4- 9/17	11 9/18- 10/1	12 10/2- 10/15	Seasonal Mean
1975	.030	.018	.034	.022	.018	.030	.007	.007	.002	.004	.004		.012
1976	.023	.026	.024	.030	.020	.016	.007	.006	.006	.003	.002	.000	.013
1977	.015	.032	.023	.025	.011	.016	.010	.001	.003	.003	.000		.016
1978	.037	.029	.024	.023	.008	.004	.005	.001	.004	.002	.000		.013
1979	.032	.037	.019	.016	.009	.021	.010	.004	.008	.004	.001		.015

Table 9. Comparative coho salmon caught per angler hour of effort during the Juneau area marine recreational fishery.

Period	1 5/1- 5/14	2 5/15- 5/28	3 5/29- 6/11	4 6/12- 6/25	5 6/26- 7/9	6 7/10- 7/23	7 7/24- 8/6	8 8/7- 8/20	9 8/21- 9/3	10 9/4- 9/17	11 9/18- 10/1	12 10/2- 10/15	Seasonal Mean
1960	.000	.000	.003	.002	.003	.009	.055	.065	.092	.034			.045
1961	.000	.000	.000	.001	.006	.042	.079	.054	.100				.056
1962	.000	.000	.000	.010	.002	.014	.034	.086	.126				.052
1963	.000	.000	.002	.006	.020	.044	.102	.145	.121	.143			.086
1964	.000	.001	.002	.004	.035	.041	.099	.095	.131				.080
1965	.000	.000	.015	.007	.026	.074	.093	.114	.108				.083
1966	.000	.000	.001	.002	.019	.028	.049	.085	.063				.049
1967	.000	.000	.000	.006	.015	.019	.034	.074	.063				.041
1968			.000	.061	.072	.119	.143	.149	.232				.133
1969			.000	.012	.026	.030	.081	.099					.059
1970			.002	.002	.021	.042	.057	.100	.106				.065
1971	.000	.000	.002	.005	.013	.038	.080	.087	.073	.196			.058
1972			.000	.051	.093	.102	.237	.127	.133	.120			.142
1973		.000	.005	.006	.023	.023	.034	.061	.096				.047
1974	.000	.002	.001	.008	.044	.066	.087	.089	.092	.133			.076

Table 9. (Cont'd.) Comparative coho salmon caught per angler hour of effort during the Juneau area marine recreational fishery.

Period	1 5/1- 5/14	2 5/15- 5/28	3 5/29- 6/11	4 6/12- 6/25	5 6/26- 7/9	6 7/10- 7/23	7 7/24- 8/6	8 8/7- 8/20	9 8/21- 9/3	10 9/4- 9/17	11 9/18- 10/1	12 10/2- 10/15	Seasonal Mean
1975	.000	.000	.004	.002	.025	.036	.061	.097	.066	.081	.060		.059
1976	.000	.000	.002	.006	.029	.040	.054	.063	.079	.065	.060	.005	.053
1977	.000	.001	.000	.013	.044	.081	.068	.058	.056	.045	.016		.061
1978	.000	.000	.000	.015	.065	.092	.129	.143	.106	.065	.055		.107
1979	.000	.000	.000	.002	.014	.037	.039	.043	.090	.078	.003		.041

Table 10. 1979 Juneau Roadside Sport Fishery Estimates of Effort and Catch from May 1 through September 3, 1979.

	MAY	JUNE	JULY	AUGUST	SEPT. (1-3)	SEASON TOTAL	1978 TOTAL
Angler Trips	4,718	4,980	12,368	4,059	597	26,722	19,159
Angler Hours	12,448	9,612	26,198	9,686	1,220	59,164	43,578
Dolly Varden	1,391	893	4,289	1,662	328	8,563	8,394
Brook Char *	0	692	48	175	0	915	222
Rainbow-Cutthroat *	81	376	82	364	43	946	488
Steelhead *	127	0	0	0	0	127	55
Chinook Salmon	51	115	0	0	0	166	69
Coho Salmon	0	0	186	91	77	354	666
Chum Salmon	0	0	271	254	36	561	424
Pink Salmon	0	125	7,327	2,582	472	10,506	2,195
Sockeye Salmon	0	5	12	41	0	58	198
Halibut	25	21	24	0	0	70	90
Other (Flounder, Cod)	63	0	12	59	0	134	657

* Separate expansions. Estimates still are unreasistically high, perhaps owing to bias in response from only successful anglers.

Table 11. Estimate of Catch Per Unit of Effort by Species in the Juneau Area Roadside Sport Fishery May 1 through September 3, 1979.

		MAY	JUNE	JULY	AUGUST	SEPTEMBER	SEASON	TIME PERIOD USED FOR SEASON TOTALS
Dolly Varden	/Hour	.112	.093	.164	.172	.269	.145	
	/Trip	.295	.179	.347	.409	.549	.320	May 1 - Sept. 3
Brook Char	/Hour	.000	1.147	.196	4.000	.000	1.470	Separate Expansion
	/Trip	.000	5.406	1.000	7.950	.000	3.375	May 1 - Sept. 3
Rainbow-	/Hour	.007	.039	.003	.038	.035	.016	
Cutthroat	/Trip	.017	.076	.007	.090	.072	.035	May 1 - Sept. 3
Steelhead	/Hour	.010	.000	.000	.000	.000	.010	
	/Trip	.027	.000	.000	.000	.000	.027	May 1 - 31
Chinook	/Hour	.004	.012	.000	.000	.000	.003	
	/Trip	.011	.023	.000	.000	.000	.006	May 1 - Sept. 3
Coho	/Hour	.000	.000	.007	.009	.063		
	/Trip	.000	.000	.015	.022	.129		July 1 - Sept. 3
Chum	/Hour	.000	.000	.010	.026	.030		
	/Trip	.000	.000	.022	.063	.060		July 1 - Sept. 3
Pink	/Hour	.000	.013	.280	.267	.387		
	/Trip	.000	.025	.592	.636	.791		July 1 - Sept. 3
Sockeye	/Hour	.000	.000+	.000+	.004	.000	.001	Not comparable due to
	/Trip	.000	.001	.001	.010	.000	.002	Emergency Closures

* Catch rates unrealistically high; bias owing to postcard response.

Table 11. (Cont'd.) Estimate of Catch Per Unit of Effory by Species in the Juneau Area Roadside Sport Fishery May 1 through September 3, 1979.

		MAY	JUNE	JULY	AUGUST	SEPTEMBER	SEASON	TIME PERIOD USED FOR SEASON TOTALS
Halibut	/Hour	.002	.002	.001	.000	.000	.001	
	/Trip	.005	.004	.002	.000	.000	.003	May 1 - Sept. 3
Other	/Hour	.005	.000	.000+	.006	.000	.002	
	/Trip	.013	.000	.001	.015	.000	.005	May 1 - Sept. 3

Table 12. Juneau Roadside Creel Survey. Comparative catch rates by month and year (catch per angler hour).

	YEAR	MAY	JUNE	JULY	AUGUST	SEPTEMBER
	1977	.201	.052	.227	.412	.447
Dolly Varden	1978	.141	.166	.244	.158	.102
	1979	.112	.093	.164	.172	.269
	1977	.055	.054	.004	.074	.154
Rainbow/	1978	.009	.020	.005	.019	.007
Cutthroat	1979	.007	.039	.003	.038	.035
	1977	.000	.000	.088	.010	.000
Pink Salmon	1978	.000	.003	.069	.086	.119
	1979	.000	.013	.280	.267	.387
	1977	.000	.001	.000	.000	.000
Chinook Salmon	1978	.004	.001	.000	.000	.004
	1979	.004	.012	.000	.000	.000
	1977	.000	.000	.025	.032	.086
Coho Salmon	1978	.000	.002	.020	.030	.019
	1979	.000	.000	.007	.009	.063
	1977	.000	.070	.000	.000	.000
Sockeye	1978	.000	.019	.002	.000	.000
	1979	.000	.000	.000	.004	.000
	1977	.000	.000	.000	.000	.000
Chum Salmon	1978	.000	.000	.020	.005	.000
	1979	.000	.000	.010	.026	.080
	1977	.000	.000	.000	.000	.000
Steelhead	1978	.009	.000	.000	.000	.000
	1979	.010	.000	.000	.000	.000

Table 13. Chilkoot River Coho Salmon Sport Fishery, Comparisons Between Years of Census.

YEAR Time Period	1974 10/5 - 10/28	1978 9/22 - 10/23	1979 9/22 - 10/23 *
Angler Trips	588	1,103	820
Angler Hours	3,831	3,813	4,633
Coho Catch	768	788	258
(Chum/hour)	(.200)	(.207)	(.006)
Dolly Varden Catch	...	117	148
(Dolly Varden/hour)	...	(.031)	(.032)
Escapement of Coho before SF harvest	...	1,876	1,070
Escapement of Coho to spawning grounds	...	1,088	812
Percent of Coho from CF escapement being harvested in sport fishery	...	42%	24.1%
Percent non-resident anglers	73	73	87 (71% Canadians)

* Expanded from 10/2 - 10/24 observations based on 1978 seasonal effort trend.

October 13 an Emergency Order was issued which closed the area above the weir to the taking of coho salmon. A previous Emergency Regulation had already reduced the coho bag and possession limit to two coho in all areas remaining open to salmon fishing. The Emergency Order occurred too late in the season to have a major impact, but appeared to reduce effort significantly in the late part of the fishery. The Emergency Order was scheduled to remain in effect until a desired spawning ground escapement of 1,000 coho was reached, but with an end-season spawning ground escapement of 812, the Emergency Order was not relaxed. Of the anglers interviewed, 87% were non-Alaskan and 71% were Canadian. Haines residents tended to fish heaviest after the closure.

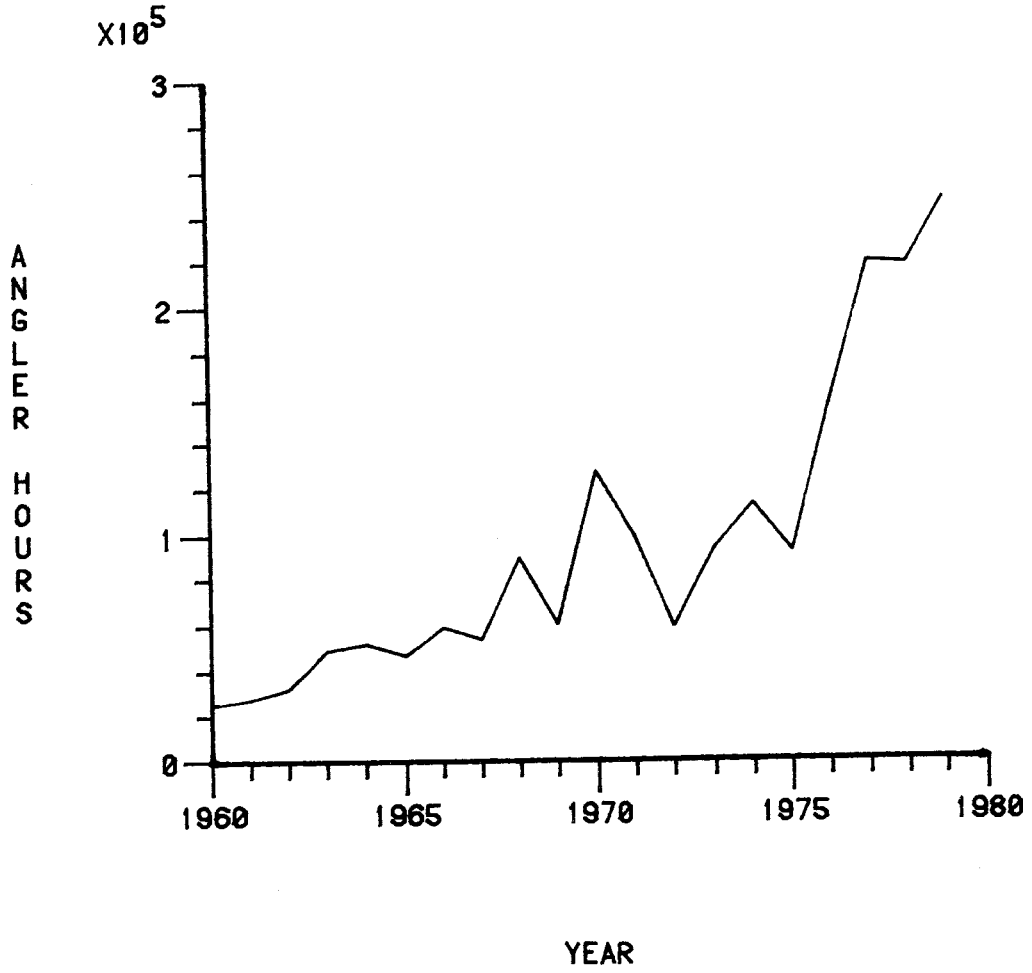
DISCUSSION

During the 1979 season, Juneau marine sport fishermen expended 246,386 hours of angling effort, up 13% from the 217,853 angler hours estimated for the 1978 survey season (see Fig. 2). The number of angler trips dropped compared to 1978, however, the mean number of hours per angling trip was 1.09 hours longer in 1979 and hence the increase in total effort.

The estimated 3,637 legal chinook salmon captured was a near record catch. The catch per angler hour for a legal chinook salmon was highest in the last 2 weeks of May, with a steady decline into early July at which time there was a rebound in the CPUE (see Fig. 5). Following the Golden North Salmon Derby there appeared the predictable lull in the sport trolling effort and very low catch rates for legal chinook salmon, however, the catch and catch rates for chinook salmon during the second half of the season were relatively good, compared to recent years. In the last 12 weeks of the season there was no observed increase in the percentage of released sublegal chinook salmon in the total chinook salmon catch (kept and released) yet these late season chinook salmon were smaller, immature fish. Kissner (pers. comm.) believes these late season chinook salmon might be local rearing juvenile chinook salmon from the Taku River system. Chinook salmon biologists are expecting a strong return of mature fish to the Taku system in 1980, and the late season rebound seen in 1979 might be an indicator of increasing abundance in chinook salmon from the Taku River system.

Nevertheless, it was taking the Juneau boat sport angler an average of 12.2 trips to catch one legal chinook salmon. Armstrong (1979, unp. M.S.) compared the salmon sport fishing in southeast Alaska with similar sport fisheries along the westcoast of North America and showed how poor our sport fisheries are when compared to others. Armstrong addressed the problem of allocation as being a principal factor regulating the success of southeast Alaska sport fishermen. Of the total catch of chinook in southeast Alaska, commercial and sport, sport fishing takes only 4% (1977 data).

FIGURE 2. SEASONAL ANGLER HOURS IN THE JUNEAU MARINE SPORT FISHERY, 1960 THROUGH 1979.



Since 1960, there has been an observed decline in the catch rate for chinook salmon in the Juneau marine sport fishery (See Fig. 3). Mattson (1975) stated that the increase in angling effort and decrease in catch rate were evidence that local chinook salmon stocks in the Juneau area are being over fished. Perhaps the decrease in mean size of captured chinook salmon and decreased escapements are better indicators of overharvest. Interpreting CPUE is complicated when a fishery is expanding as dramatically as is the Juneau marine sport fishery.

The coho salmon catch for the 1979 season was mediocre, and the seasonal catch rate of .028 coho salmon per angler hour, was a near record low (See Fig. 4). The parent year return of 1975 was not strong but the problem of fewer coho salmon in inside waters in 1979 rested primarily on an inordinate misallocation of exploitation of the resource. Power trollers in outside waters captured over 600,000 coho salmon that were bound for inside waters.

The 33rd Golden North Salmon Derby netted $15,314 for the Territorial Sportsman Association. The increasing worth of salmons unquestionably reduced the amount of fish Derby anglers were willing to donate, as only 35% of the chinook salmon caught and 21% of the coho salmon caught were entered. The amount of fish that is removed from local waters during 3 days of Derby angling is truly impressive, when Derby catches are compared to the seasonal catch estimates. Combining Derby catches with catches in the normal recreational fishery very significantly increases the seasonal totals and therefore Derby catches must not be overlooked. As by example, in 1979, 22% of the 4,644 legal chinook salmon and 32% of the 10,150 coho salmon captured were taken during 3 days of Derby fishing.

Micro Wire Tagging

Analysis of data concerning CWT coho salmon captured in the Juneau marine sport fishery leads to an interesting comparison of the contribution of wild stocks and facility stocks of coho salmon to this sport fishery. Using methods described earlier, it was determined that wild stocks of coho salmon from the Taku, Snettisham, and Berner's systems contributed 18% of the coho salmon captured in the Juneau sport fishery, whereas the releases of coho from Fish Creek and the Mendenhall Facilities contributed approximately 2% of the coho salmon.

There were 160,152 coho salmon smolts marked before release at the Fish Creek and Mendenhall facilities in the spring and summer of 1978. Of these, an estimated 72 were captured in the sport fishery during 1979. This results in a return of 0.45 coho into the sport fishery from every 1,000 marked smolts (72/160,152 x 1,000 = 0.45).

Looking at the return for wild coho salmon, we see that an estimated 36 tagged coho salmon from Taku and Berners were intercepted in the sport fishery. Koerner (1977) reported that 30,349 coho salmon from the Taku and Berner's systems were tagged as yearlings in 1977, fish that would have

FIGURE 3. SEASONAL CATCH RATE FOR CHINOOK SALMON OVER 71 CM IN THE JUNEAU MARINE SPORT FISHERY, 1960 THROUGH 1979.

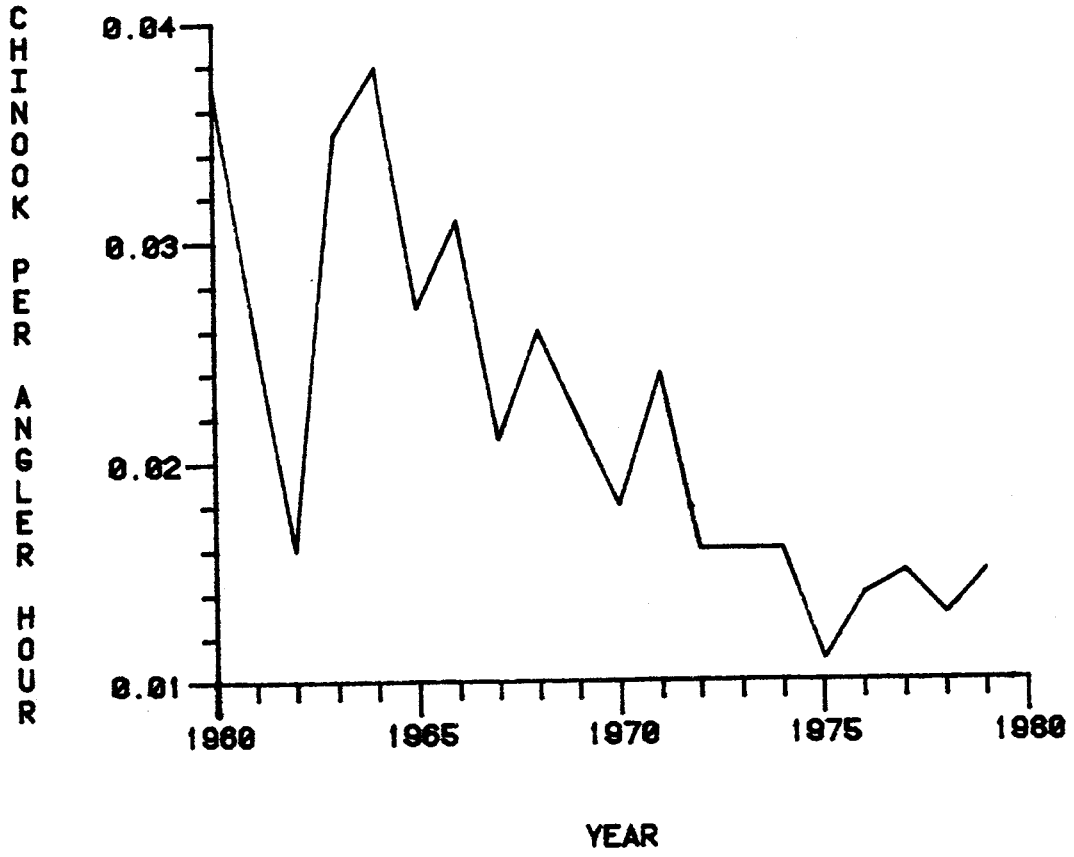


FIGURE 4. SEASONAL CATCH RATE FOR COHO SALMON IN THE JUNEAU MARINE SPORT FISHERY, 1960 THROUGH 1979.

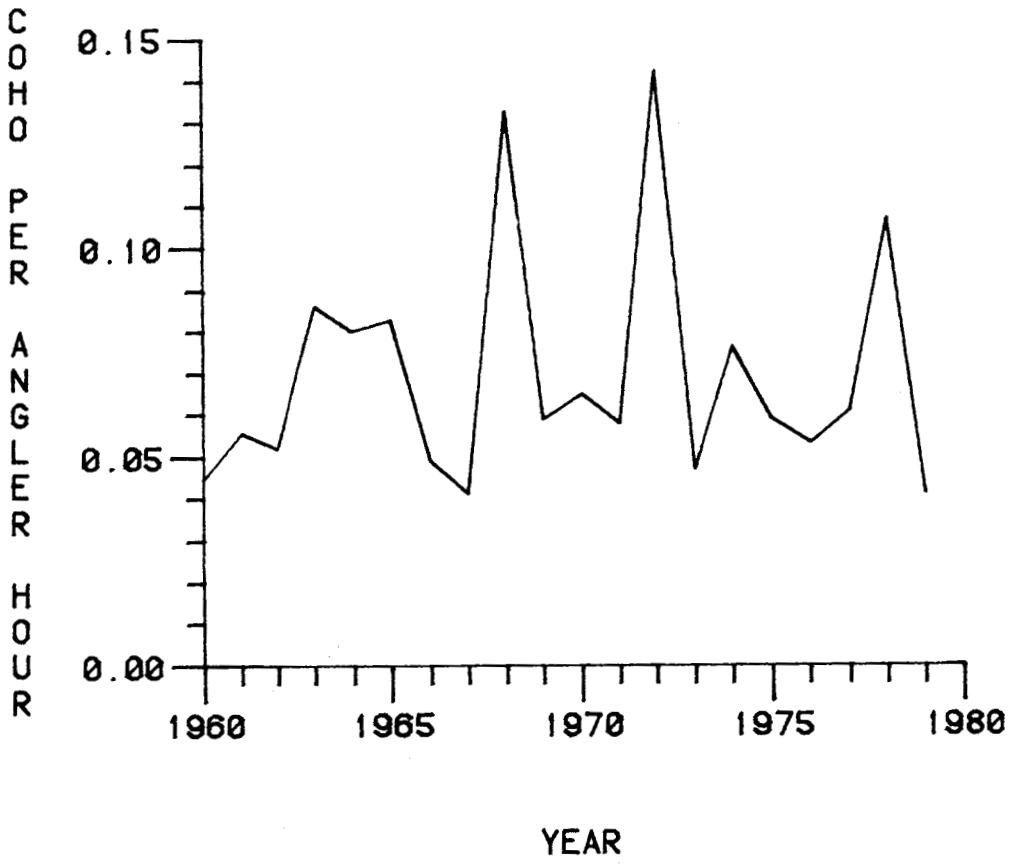
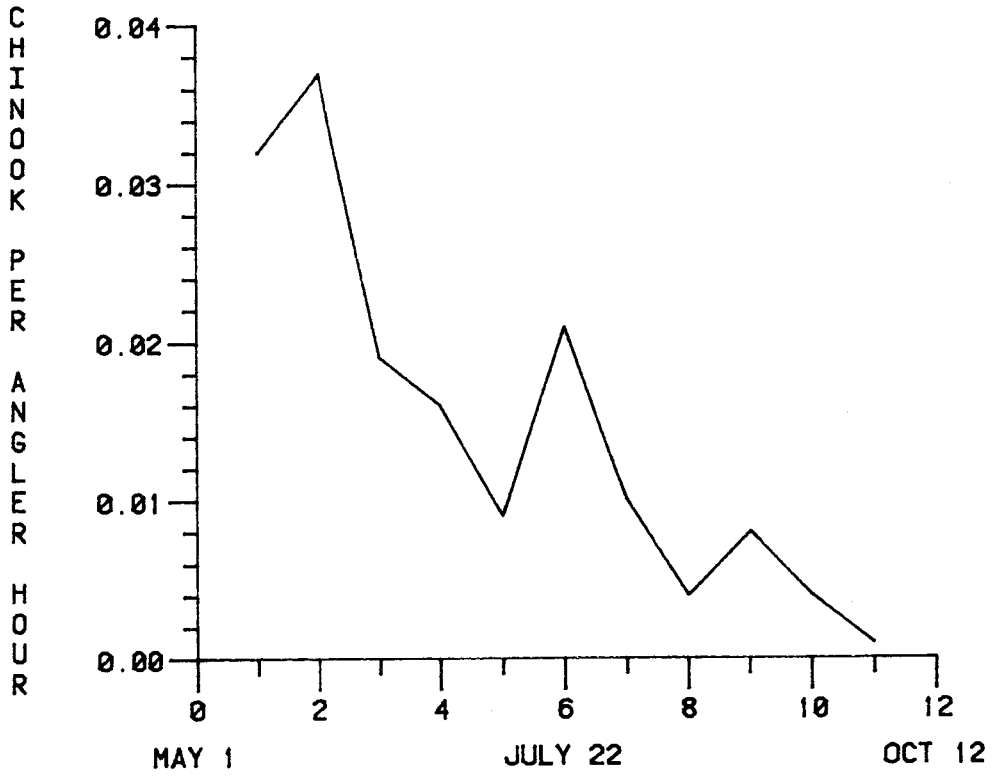


FIGURE 5. CATCH RATE FOR LEGAL CHINOOK SALMON IN THE JUNEAU MARINE SPORT FISHERY, BY BIWEEKLY PERIOD, 1979.



entered the marine sport fishery in 1979. Not all of the 30,349 coho would have smoltified. Some of these fish would have died during the duration of time spent in fresh water until smoltification the following spring. Not much is known about mortality of yearlings to smolt. Crone (1968) followed survivorship of juvenile coho salmon up through the second summer in fresh water for coho salmon in a southeastern Alaskan stream but this study did not follow through into the final winter and spring of freshwater life.

All that can be said is of those 30,349 yearling cohos tagged, some fraction of those died before smoltification in 1978, and therfore calculating a return of fish per 1,000 marked yearlings instead of 1,000 marked smolts will result in a low return. In any case, 36 tagged coho salmon from the Taku and Berner's systems were estimated to have been caught from those 30,349; which results in 1.19 coho salmon captured in the Juneau sport fishery for every 1,000 yearling wild coho salmon (36/30,349 x 1,000 = 1.19). Comparing the return of facility coho to wild coho salmon, it appears that the natural system delivered perhaps three times the fish to the Juneau sport fishery as did the facility releases per 1,000 juvenile coho salmon, which is another indicator of the value of our natural fish producing areas.

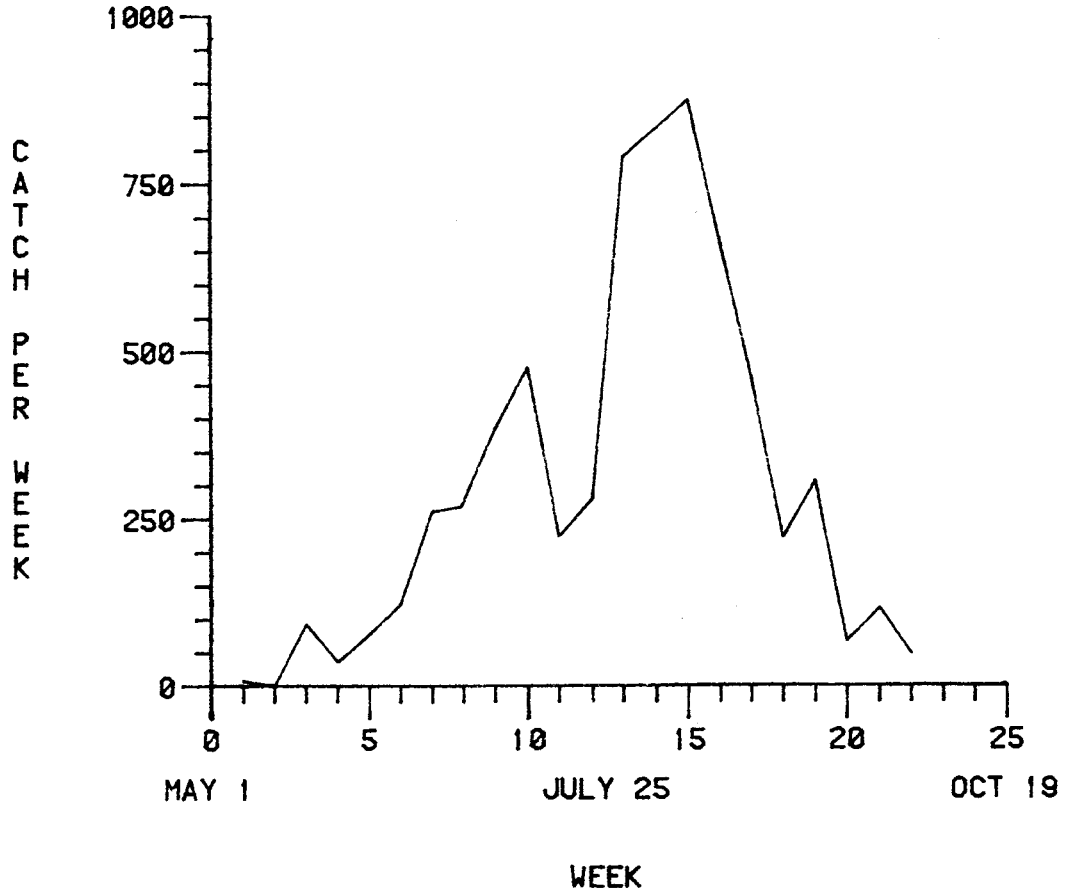
Figure 6 shows the estimated weekly catches of halibut. There was a record catch of halibut in 1979. Although the catch rate was very good, it was not the highest on record for the Juneau marine recreational fishery. Preference for halibut as the target species was as high as 40% for the sport fleet late in the season, and with this directed effort, many more other demersal fishes were taken than in past seasons.

The greater number of halibut in inside waters seemed to be an unaccountable phenomenon. There was no apparent abundant year class and no information to indicate strengthening of stocks. More people were fishing for halibut but that was no doubt partly due to an increased availability of this species. As anglers continue to pursue halibut, other demersal fishes might become more preferred and more intensively fished than at present. Carlson and Haight (1972) studied a species of rockfish, Sebastes flavidus (family Scorpaenidae), in southern Lynn Canal waters and found it to exhibit home site preference and homing ability. This, coupled with slow growth, lead Carlson and Haight to conclude that local populations of this species could easily be fished out. Hence, more specific information is needed concerning the sport harvest of demersal fishes because it appears these species could be severely impacted from angling pressure (also, see Beamish 1979).

Juneau Roadside

During the 1979 roadside season of May 1 through September 3, an estimated 59,164 angler hours were expended, up 36% from 1978. Most of this increased effort came during the month of July when shoreline anglers were

FIGURE 6. WEEKLY CATCH OF PACIFIC HALIBUT IN THE JUNEAU MARINE SPORT FISHERY DURING THE 1979 SEASON.



taking advantage of the tremendous return of pink salmon to local streams. More than 10,000 pink salmon were estimated to have been caught in 1979 by shoreline anglers, surpassing the estimated catch of Dolly Varden.

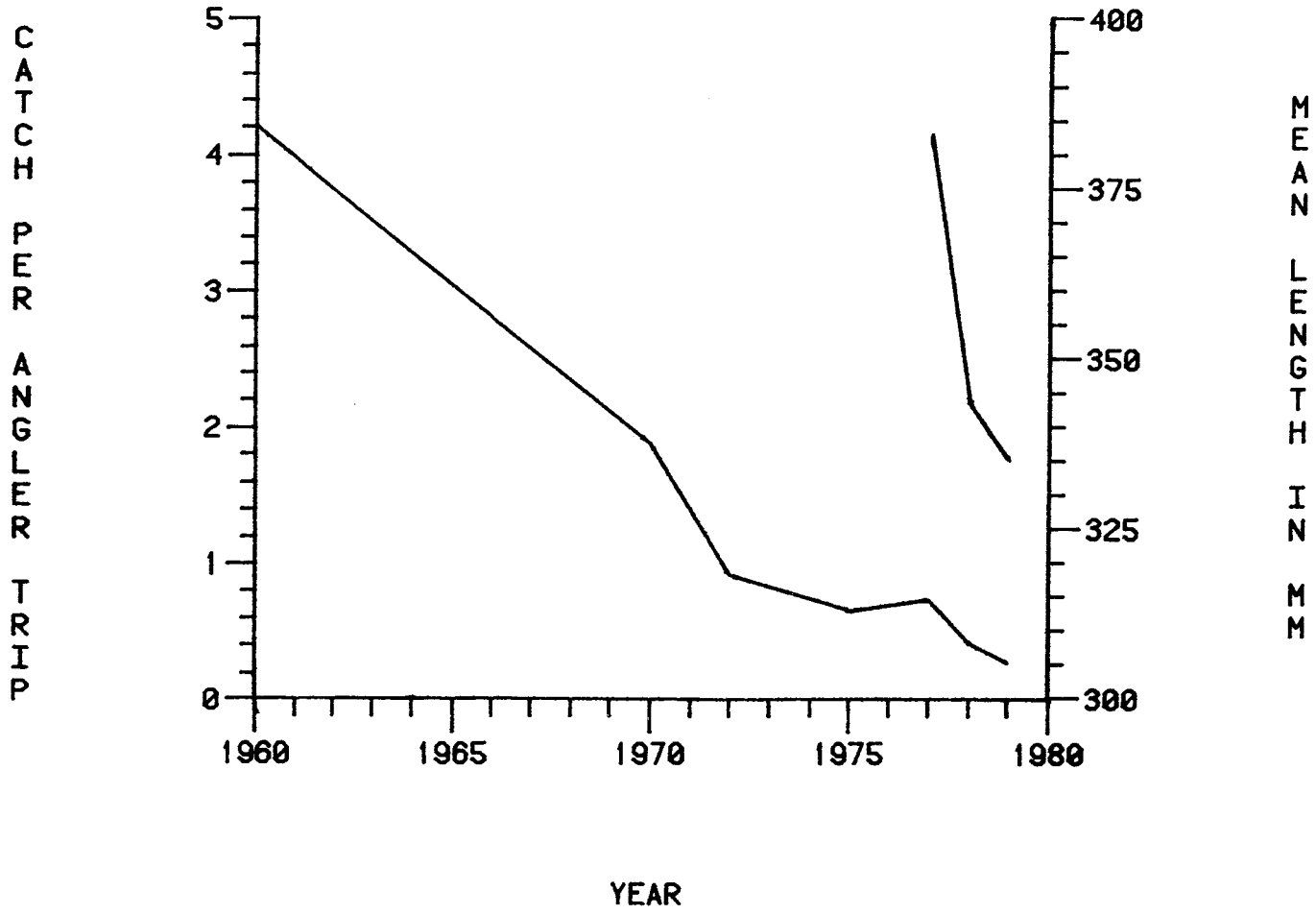
The seasonal catch of Dolly Varden estimated at 8,563 was slightly above the catch during 1978, but with the expanded effort, the catch rate for Dolly Varden declined to where it was taking almost four fishing trips to catch one Dolly Varden (Figure 7). Since 1975 the catch of Dolly Varden has remained stable, even though the effort has increased. It is hard to infer what is happening to the Dolly Varden populations from trends in effort, catch and catch rate. If the Dolly Varden numbers are declining, a declining catch might be expected. Since no more Dollies are being caught with an increase in effort it might be assummed that all the available Dolly Varden are being taken by sport anglers and with further increases in effort, the available fish are divided up among more and more competing anglers and hence fewer fish per unit-effort. If there is a portion of Dolly Varden available for capture, a critical question might be what percent of the total population is this available portion?

If all "available" Dolly Varden are being captured over time, might not this really mean "too many" are being captured? Looking at mean fork lengths of Dolly Varden captured in recent years, an observed decrease in mean length is noted. Mean lengths are as follows: 383 mm, 343 mm and 335 mm for 1977, 1978, 1979 respectively. When comparing mean lengths for 1978 and 1979, this is not a significant difference. However, the difference in mean fork length between 1977 and 1979 is significant (PF.05) (Figure 7).

In 1978 a regulation imposed a two fish over 12" (305 mm) limit on Dolly Varden captured in the Juneau area. However, 1978 and 1979 creel survey data have indicated this regulation to be nonrestrictive. Therefore declines in the mean size of captured fish taken over time might be an indicator of the effects of harvest on this resource and not an artifact caused by a changing regulation affecting harvest potential. If the mean size of Dolly Varden is decreasing, the implication is that mortality is exceeding recruitment and that increasing mortality on older fish is due to excessive harvest by fishermen.

During the winter 1979 meeting of the Alaska Board of Fisheries, new regulations were passed to reduce the harvest of Dolly Varden in the Juneau area. A new bag and possession limit of two fish will be in effect commencing in the spring of 1980 and there will also be local time and area closures. The taking of Dolly Varden in freshwater will be restricted to June through August with Montana and McGinnis Creeks closed year round. There will also be a local coastal marine closure on the taking of Dolly Varden during the months of April and May. These regulations might reduce the local sport harvest of Dolly Varden by as much as 50%.

FIGURE 7. COMPARATIVE CATCH RATES AND MEAN FORK LENGTHS OF DOLLY VARDEN CAPTURED IN THE JUNEAU ROADSIDE SPORT FISHERY.



Marriott et. al. (1979) discussed various inadequacies in the sampling design of the saltwater and roadside creel surveys conducted in the Juneau area. Two major weak areas are: 1) the small sample size of aerial boat counts and 2) the postcard component of the roadside survey. Mills (1979) described a method for eliminating bias where the chance of response from an angler is dependent upon fishing success. The Juneau postcard survey has no built in mechanisms to correct the biased information resulting from receiving postcards from mostly successful anglers.

In select areas with single species fisheries - like brook char in Salmon Creek Reservoir - the estimated catch of 740 seems unreasonably high when a recent population estimate showed from 1,100 to 1,500 fish in that reservoir (Schmidt, 1977). Several other harvest estimates in the 1979 roadside fishery appeared to be inflated- as for example, the steelhead and rainbow-cutthroat catch estimates.

The mean catch rate for Dolly Varden of responding postcard anglers was about 30% higher than the mean catch rate for interviewed anglers. "Postcard" anglers might generally be considered to be more remote fishers and thus a higher catch rate could be expected, but most of the summer effort for Dolly Varden may not be remote and the 30% higher catch rate could be a visible measure of the response bias. If the catch per unit-effort for Dolly Varden for interviewed anglers only is multipled by the estimated roadside effort from interviews and postcard surveys, then the estimated catch of Dolly Varden is decreased by slightly over 1,000 fish. This might give a more reasonable estimate of catch, which would then indicate a lower catch in 1979 than in 1978.

The creel survey program covering the Juneau sport fishery needs to be renovated statistically such that levels of confidence can be ascribed to estimates of effort and catch. It is hoped that progress along these lines will be made in time for the 1980 creel sampling season.

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